

REMARKS

Claims 1-18 and 34-37 are pending in the application. New claim 38 has been added to the application. Therefore, claims 1-18 and 34-38 are at issue.

This amendment is submitted in accordance with 37 C.F.R. §1.116(a) and §1.116(b) in order to present the rejected claims in a better form for allowance or appeal. The amendment is necessary to eliminate a rejection under 35 U.S.C. §103. This amendment was not presented earlier because it was believed, and is still believed, that Amendment "A" filed on July 5, 2005 fully addressed and overcame all rejections and objections. This amendment should be entered because it places the application in better form for allowance or appeal, and the amendment does not require further searching or present any new issues.

New claim 38 recites that the amphipathic copolymer is capable of delaminating the layered silicate. Support for this new claim can be found in the specification at page 5, lines 1-13 and page 18, lines 1-6 and 22-27, for example.

The present invention is directed to a composition capable of thickening hydrophobic liquids. The composition comprises (a) a layered silicate material, wherein the surfaces of the layered silicate are modified by (b) an amphipathic copolymer. The amphipathic copolymer comprises (i) a first comonomer that when homopolymerized generates a hydrophilic polymer that is insoluble in a hydrophobic liquid and (ii) a second comonomer that when homopolymerized generates a hydrophobic polymer that is soluble in a hydrophobic liquid. This amphipathic copolymer is capable of delaminating,

i.e., exfoliating, clay platelets in a hydrophobic liquid. The exfoliated clay platelets then interact to thicken the hydrophobic liquid medium in which they are dispersed.

Claim 34 recites that the composition can further comprise a hydrophobic liquid, as further recited in claims 4 and 5. The compositions of claim 34 and claim 14 provide a thickened hydrophobic liquid having a Brookfield viscosity of at least 5,000 cps, and typically at least 50,000 cps, at 25°C and 0.5 rpm when 3.4 wt% of the layered silicate is present (claims 35 and 36). Compositions of the present invention can further comprise an optional thickening aid (claims 2, 3, and 15) and/or an optional functional particulate material (claims 16 and 17).

As set forth below and in the Declaration of Ashoke K. SenGupta (SenGupta Declaration) submitted concurrently with this amendment, the presently claimed compositions have an unexpected ability to thicken hydrophobic liquids, and the compositions are neither taught nor suggested by the cited references, alone or in combination.

Claims 1-10, 12-18, and 34-37 stand rejected under 35 U.S.C. §103 as being obvious over Finlayson U.S. Patent No. 4,208,218 ('218) in view of Wong et al. U.S. Patent No. 4,830,945 ('945). The examiner contends that the claims cover comonomers in the prior art and no unexpected results have been demonstrated. Applicants traverse this rejection in view of the SenGupta Declaration submitted with this amendment and the fact that applicants are not claiming solely a comonomer or a copolymer, but a layered silicate

material surface modified with a particularly claimed amphipathic copolymer. The surface-modified layered silicate material, unexpectedly, is capable of thickening a hydrophobic liquid.

The '218 patent is directed to an organophilic clay gellant comprising a smectite-type clay having a defined cation exchange capacity, and, where surface is modified with a quaternary ammonium compound (QAC). The QAC is monomeric and cationic. The '218 patent teachings are limited to a clay treatment using a QAC, and absolutely fails to teach or suggest any other monomeric, let alone *polymeric*, modifying agent for the smectite clay.

The QAC disclosed in the '218 patent is defined at column 2, lines 34-55. This QAC is a monomeric compound, as opposed to the specific type of polymeric surface modifying compound recited in the present claims. The '218 patent fails to teach or suggest any polymer as the smectite clay modifying agent, and, therefore, the '218 patent cannot possibly teach or suggest the specific type of copolymer recited in the present claims.

The chemical properties of the QACs disclosed in the '218 patent are substantially different from the amphipathic copolymer recited in the present claims. A QAC is a low molecular weight cationic surfactant. The presently claimed copolymers are high molecular compounds and are not cationic. Accordingly, a person skilled in the art would not have been motivated from the '218 patent to substitute any polymer for the quaternary ammonium compound of the '218 patent, let

alone the amphipathic copolymers recited in the present claims.

Although the QAC treated clays of the '218 patent thicken hydrophobic liquids, a jump in reasoning to conclude *all* treated clays thicken hydrophobic liquids simply cannot be made. In fact, and to the contrary, not all dispersions of treated clays thicken hydrophobic liquids.

In addition, the presently claimed compositions effectively thicken hydrophobic liquids to an unexpected degree and overcome disadvantages associated with clay-QAC thickeners, such as those disclosed in the '218 patent. For example, the presently claimed compositions avoid the skin irritation properties of QACs, which increases the range of practical applications in which the present compositions can be used, e.g., personal care products. Further, the '218 patent requires a clay having a minimum cation exchange capacity (CEC) because an ion-exchange reaction occurs between the cationic QAC and the clay. The properties of such a treated clay vary depending on the CEC of the clay. The presently claimed compositions do not rely upon the CEC of the clay, thus composition properties are more uniform.

Finally, and importantly, the SenGupta Declaration shows, with objective evidence, that the presently claimed compositions outperform the treated clays of the '218 patent. See SenGupta Declaration, paragraphs 22-24. A composition of the present invention containing PEG 30 dipolyhydroxystearate as the amphipathic polymer was added to a hydrophilic liquid. See Table IV, paragraph 23, SenGupta Declara-

tion. The resulting Brookfield viscosities of the thickened octyl stearate of Sample 1 of Table IV was 364,000 cps (centipoises) at 1 rpm and 196,000 cps at 5 rpm. A QAC of the '218 patent, in Sample 5, provided thickened compositions of 140,000 cps (1 rpm) and 56,000 cps (5 rpm). Similar results were observed for Samples 2-4 compared to Samples 6-8, respectively. Compositions of the present invention are clearly superior thickening agents for a hydrophobic liquid compared to the clay-QAC composition of the '218 patent.

Table I of the SenGupta Declaration further shows that not all copolymers thicken a hydrophobic liquid. A composition of the present invention containing PEG 30 dipolyhydroxystearate as the amphipathic copolymer was added to a hydrophobic liquid, i.e., octyl stearate and isododecane, at a 5 weight percent (wt%) loading of the clay (Sample Nos. 1 and 2 of paragraph 16). The resulting Brookfield viscosities of the thickened octyl stearate compositions of Sample No. 1 were 184,000 cps at 1 rpm and 88,000 cps at 5 rpm. Sample Nos. 4-12 surface treat a smectite clay with copolymer outside the scope of the claimed copolymers. Therefore, a person skilled in the art, after reading the '218 patent not only would have to consider substituting a copolymer for a QAC, but also must select the proper copolymer.

It is submitted that a person skilled in the art, after reading the '218 patent, simply would not have had any motivation or incentive to substitute a presently claimed amphipathic copolymer for the monomeric, cationic quaternary ammonium compound disclosed

in the '218 patent with any expectation of achieving the unexpectedly high degree of thickening provided by the presently claimed compositions. The '218 patent provides no teachings or suggestions that any compound can be substituted for the QACs disclosed therein, and, because of the substantial chemical and physical differences between a claimed amphipathic copolymer and a QAC, a person skilled in the art simply would not make a huge and illogical leap in reasoning to substitute a copolymer for a QAC to treat a clay. In fact, such a substitution typically does not yield as thickened a composition as a presently claimed composition, as shown in the SenGupta Declaration, Sample Nos. 4-12, Table I. The '218 patent absolutely fails to provide any teaching or suggestion that would have led a person skilled in the art to substituting a *claimed* amphipathic copolymer for a QAC.

The '945 patent fails to cure the deficiencies of the '218 patent such that a combination of the '218 and '945 patents would have rendered the present claims obvious. The '945 patent is directed to a photographic developer. The developer contains resin particles having copolymeric moieties attached thereto. These moieties act to prevent flocculation. The examiner contends that it would have been obvious to use a copolymer taught in the '945 patent as a substitute for the QAC of the '218 patent and thereby arrive at the presently claimed invention. Applicants traverse this conclusion. In fact, the enclosed SenGupta Declaration shows that such a substitution *fails* to thicken a hydrophobic liquid.

Paragraph 16 of the SenGupta Declaration contains Sample Nos. 5-8, in which a smectite clay is modified with a copolymer disclosed in the '945 patent. Sample Nos. 4 and 9-12 use additional copolymers to modify the smectite clay. The SenGupta Declaration shows that the copolymer of Sample Nos. 4-12 failed to thicken the hydrophobic liquid at all. Thus, substituting a copolymer of the '945 patent for the QAC of the '218 provided substantially inferior results to using a QAC as a modifying agent.

The SenGupta Declaration, in Table II and paragraphs 17-20, further shows a layered silicate is needed to achieve thickening. The amphipathic copolymer alone is not responsible for thickening of the hydrophobic liquid. Adding an amphipathic copolymer recited in claim 1 to a nonlayering pigment, e.g., TiO_2 , does not increase the viscosity of a hydrophobic liquid. See SenGupta Declaration, paragraphs 17-19. In fact, a copolymer, claimed or otherwise, decreased the viscosity of the pigment dispersion (see Table II, Sample No. 1 compared to Sample Nos. 4-10). Therefore, it is the combination of a layered silicate material and a recited amphipathic copolymer that provides the unexpected benefits of the present invention.

As stated above, the '218 patent, directed to treated clays, absolutely fails to teach or suggest any possible substitutions for the QACs disclosed therein. The '945 patent is not directed to clays, but is directed to resins having a modified surface. The examiner has not pointed to any nexus between the '218 and '945 patents that would lead a person skilled in the art to consider the references in combination. How-

ever, even lacking this nexus, applicants have used copolymers of the '945 patent to modify a smectite clay, and contrary to the examiner's contentions, no thickening of a hydrophobic liquid occurred.

Therefore, a person skilled in the art, guided by the combined teachings of the '218 and '945 patents, would not have been motivated to substitute either a copolymer of the '945 patent for the QAC of the '218 patent, or the clay of the '218 patent for the resin of the '945 patent. Neither the '218 patent nor the '945 patent teaches or remotely suggests such substitutions. If such a substitution was made, however, no thickening would have resulted as shown by the data in the tables of the SenGupta Declaration. Applicants, therefore, submit that the combination of the '218 and '945 patents fails to provide any motivation or incentive wherein either a copolymer of the '945 patent can be substituted for the QAC of the '218 patent or the resin of the '945 patent can be substituted for the clay of the '218 patent. Applicants also submit that such a substitution, if performed, simply does not function with respect to thickening a hydrophobic liquid. This conclusion is evident from the SenGupta Declaration wherein such a substitution was made, and failed.

In summary, the combined teachings of the '218 and '945 patents fail to teach or suggest the presently claimed invention, and fail to provide any motivation for a person skilled in the art to modify the teachings therein and arrive at the presently claimed invention. Because the fields of resins and clays, and amphipathic copolymers and QACs, are so

diverse, because the combined teachings of the cited references fail to provide any nexus between the disclosed subject matter, and because of the objective data provided in the SenGupta Declaration, it is submitted the rejection of claims 1-10, 12-18, and 34-37 as being obvious over a combination of the '218 and '945 patents is in error and should be withdrawn. It also is submitted that new claim 38 is allowable for the same reason the pending claims are allowable.

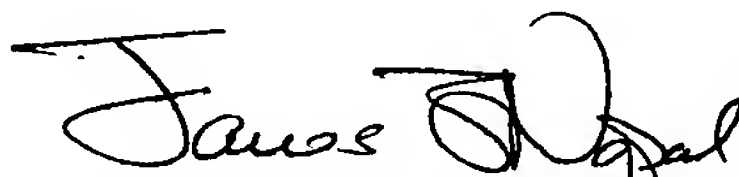
It is further submitted that the claims are in proper form and scope for allowance. An early and favorable action on the merits is respectfully requested.

Should the examiner wish to discuss the foregoing, or any matter of form in an effort to advance this application toward allowance, the examiner is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

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January 17, 2006